CNM Seminar

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Title: **Understanding the Patterning Limitations of Electron Beam Nanolithography**

When: Friday, March 22, 2002

Where: Bldg. 401, Rm. B3100 A&B

Time: 2:00 p.m.

Host: Derrick Mancini

ABSTRACT

The technology of choice for the highest resolution lithography available usually is based on high-energy electron beams. One of the main reasons is the fact that these electrons can be focused to very small spot sizes of the order of 4 to 5 nm in some cases. While electron optics is quite well understood, the interaction of these electrons with the materials used in device fabrication to record the desired patterns is not. Modern recording materials (called resists) are a complex mixture of components that need to offer good processing and recording properties. It is this aspect of the lithographic process that will dictate the ultimate patterning resolution capabilities of electron beam nanolithography. This talk will present a comprehensive image formation model for positive and negative chemically amplified resists used in modern e-beam nanolithography (EPL, DWL). The model includes all aspects of the image formation process, such as understanding energy-loss mechanisms in resists, image recording after exposure, the development process and the effect of exposure statistics on the sidewall roughness and resolution of the resist structures made. As these fundamental aspects of nanopatterning using electron beams are understood, options available for sub- 10 nm patterning will be discussed.